COURSE OVERVIEW PE0817
Hydrogen: Shaping the Future Energy Transition

Course Title
Hydrogen: Shaping the Future Energy Transition

Course Date/Venue
July 13-17, 2026/Al Maya 1 Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
PE0817

Course Duration/Credits
Five days/2.75 CEUs/27.5 PDHs

Course Description

This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

This course is designed to provide participants with a detailed and up-to-date overview of Hydrogen: Shaping the Future Energy Transition. It covers the global energy transition, hydrogen role, hydrogen basics and hydrogen color spectrum; the hydrogen value chain, hydrogen market and economics as well as policy, regulations and standards; the steam methane reforming (SMR), autothermal reforming (ATR) and electrolysis technologies; the renewable hydrogen production, hydrogen production with CCUS and the emerging production technologies; the hydrogen storage technologies and hydrogen transportation methods; and the infrastructure development and safety & risk management.

During this interactive course, participants will learn the hydrogen blending in gas networks including digitalization and monitoring; the hydrogen in power generation, hydrogen in transportation, hydrogen in industry, hydrogen for energy storage and hydrogen derivatives; the impact of carbon reduction, hydrogen economics, investment and hydrogen strategy; the project development and implementation; and the hydrogen policy and global markets, next-gen electrolysis technologies, hydrogen hubs and clusters and AI and digital optimization.

Course Objectives/Outcomes & Benefits for the Participants

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain an in-depth knowledge on hydrogen
- Discuss global energy transition, hydrogen role, hydrogen basics and hydrogen color spectrum
- Recognize hydrogen value chain, hydrogen market and economics as well as policy, regulations and standards
- Explain steam methane reforming (SMR), autothermal reforming (ATR) and electrolysis technologies
- Carryout renewable hydrogen production, hydrogen production with CCUS and the emerging production technologies
- Identify hydrogen storage technologies and apply hydrogen transportation methods, infrastructure development and safety & risk management
- Apply hydrogen blending in gas networks including digitalization and monitoring
- Discuss hydrogen in power generation, hydrogen in transportation, hydrogen in industry, hydrogen for energy storage and hydrogen derivatives
- Identify the impact of carbon reduction and apply hydrogen economics, investment and hydrogen strategy
- Employ project development and implementation covering feasibility studies, site selection, engineering and design considerations and project lifecycle management
- Discuss hydrogen policy and global markets comprising of international hydrogen trade, export markets and geopolitical considerations
- Identify next-gen electrolysis technologies, hydrogen hubs and clusters and AI and digital optimization

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of hydrogen: shaping the future energy transition for energy sector professionals, environmental and sustainability professionals, engineers and technical specialists, project managers and consultants and other technical staff.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Haward's certificates are accredited by the following international accreditation organizations: -

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

- The International Accreditors for Continuing Education and Training (IACET - USA)

  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **2.75 CEUs** (Continuing Education Units) or **27.5 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

Mr. Robert Harvey, MSc (Cum Laude), BSc is a **Senior Process & Chemical Engineer** with over **30 years** of in-depth industrial experience within the **Oil & Gas**, **Refinery**, **Petrochemical**, **Mining** and **Power** industries. His expertise widely covers in the areas of **Operations Abnormalities & Plant Upset**, **Fertilizer Manufacturing** Process Technology, **Fertilizer Storage** Management (Ammonia & Urea), **Petrochemical & Fertilizer** Plants, **Nitrogen Fertilizer** Production, **Petroleum Industry Process** Engineering, **Process Equipment** Design & Troubleshooting, **Process Equipment & Piping Systems**, **Fertilizer** Manufacturing Process Technology, **Production** Management, **Process Plant** Optimization & Continuous Improvement, **Production Process** Optimization, **Process Analyzers**, **Process Equipment** Design, Vinyl Chloride Monomer (**VCM**) Manufacturing & Process Troubleshooting, **Cement** Manufacturing Process Technology & Standards, **Process Equipment & Piping** System, **Process Plant** Optimization & Continuous Improvement, **Process Plant** Performance & Efficiency, **Troubleshooting Process Operations**, Modern **Aluminium Production Processes**, **Cement Kiln Process**, **Process Engineer Calculations**, Steel Making Process, **Process Diagrams** Review, Process Hazard Analysis (**PHA**), Process Mapping, Strategical Process Control in Process Industry, **Revamping & Debottlenecking**, **Pressure Vessel** Operation, **Heat Mass Balance**, **Distillation-Column** Operation, & Troubleshooting, **Debottlenecking**, **Unit Performance** Optimization, Real Time Online Optimization, **Operations Planning** Optimization, **Engineering Problem Solving**, **Bag Filters** Operation & Maintenance, Chemical Reaction Engineering Application, **Phosphatic Industry**, **Diammonium Phosphate**, **Monoammonium Phosphate**, **NPK**, Troubleshooting Improvement, **Production** Management, **Distillation-Column** Operation & Troubleshooting, **Monomer** Handling Safety, Complex Operational Troubleshooting, Incident **Root Cause Analysis** & Corrective Action, **Fertilizer** Manufacturing, Continuous Improvement & Benchmarking, **Energy Efficiency** for Process Plants, **Pressure Vessel** Operation, **Reactors & Storage Tanks**, Dehydrating Columns, Heat & Material Balance, **P&ID** Reading & Interpretation, **Detailed Engineering Design**, **HAZOP** Leadership, Project HSE Review (**PHSER**), Safe Handling of **Propylene Oxide & Ethylene Oxide**, Safety in **Process & Industrial Plants**, Environmental Impact Assessment (**EIA**) and Effective **Risk Assessment & HAZOP** Studies. Further, he is also well versed in Feasibility Studies Analysis & Evaluation, Project Gate System Procedures, Change Management Skills, Change Management Strategy, Developing Commercial Contracts, Project Management Skills, Project Scheduling & Cost Control, FIDIC & Other Model Contracts, EPC & EPCM Contracts, Knowledge Management, Job Evaluation, Creative Problems Solving & Innovation Skills, Problem Solving & Decision Making, Strategic Planning & Creative Thinking and Mind Mapping.

During his career life, Mr. Harvey has gained his practical and field experience through his various significant positions and dedication as the **Commercial Director**, **Manufacturing Director**, **Chief Operating Officer**, **Head Projects Division**, **Project Leader**, **Lead Technical Advisor/Consultant** and **Project Consultant** to various international companies such as the Trade and Industrial Policy Strategies (TIPS), PGBI Johannesburg, IDC Green Industries SBU/Arengo 316 Pty Ltd, Ferrum Crescent Limited, CEF Limited, Rio Tinto Alcan, Industrial Development Corporation of SA (IDC) and AECI Limited.

Mr. Harvey has **Master** (**Cum Laude**) and **Bachelor** degrees in **Chemical Engineering**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**) and has delivered various trainings, seminars, conferences, workshops and courses globally.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Practical Workshops & Work Presentations
30% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Learning Design & Customization

This course can be customized to the exact requirements of clients. Haward Technology is so proud of our huge capabilities in tailoring our courses to the training needs of our valued clients.

Course Fee

US$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: ***Monday, 13th of July 2026***

0800 – 0830	*Registration & Coffee*
0830 – 0845	*Welcome & Introduction*
0845 – 0900	***PRE-TEST***
0900 – 0930	***Global Energy Transition & Hydrogen Role*** *Decarbonization Drivers and Net Zero Targets • Hydrogen as an Energy Carrier versus Fuel • Hard-to-Abate Sectors (Steel, Aviation, Shipping)*
0930 – 0945	*Break*
0945 – 1030	***Hydrogen Basics*** *Physical and Chemical Properties of Hydrogen • Energy Density (Gravimetric versus Volumetric) • Safety Characteristics (Flammability, Diffusion) • Hydrogen versus Conventional Fuels*
1030 – 1100	***Hydrogen Color Spectrum*** *Grey Hydrogen (Natural Gas-Based) • Blue Hydrogen (With CCUS) • Green Hydrogen (Renewables-Based Electrolysis) • Emerging Types (Turquoise, Pink Hydrogen)*
1100 – 1200	***Hydrogen Value Chain Overview*** *Production → Storage → Transport → Utilization • Key Infrastructure Components • Integration with Existing Oil & Gas Assets • Global Hydrogen Trade Flows*
1200 – 1215	*Break*
1215 – 1300	***Hydrogen Market & Economics*** *Cost Structure (CAPEX versus OPEX) • Levelized Cost of Hydrogen (LCOH) • Supply-Demand Outlook • Market Drivers and Barriers*

1300 – 1350	***Policy, Regulations & Standards*** *Global Hydrogen Policies (EU, Japan, UAE) • Certification Schemes (Guarantees of Origin) • Safety Standards and Codes • Regulatory Landscape*
1350 – 1400	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1400	*Lunch & End of Day One*

Day 2: ***Tuesday, 14th of July 2026***

0800 – 0900	***Steam Methane Reforming (SMR)*** *Process Fundamentals • Reaction Chemistry • Efficiency Considerations • Emission Profiles*
0900 – 0930	***Autothermal Reforming (ATR)*** *Process Configuration • Comparison with SMR • Integration with CCUS • Industrial Applications*
0930 – 0945	*Break*
0945 – 1100	***Electrolysis Technologies*** *Alkaline Electrolysis • Proton Exchange Membrane (PEM) • Solid Oxide Electrolysis (SOEC) • Efficiency and Scalability*
1100 – 1200	***Renewable Hydrogen Production*** *Solar-Powered Electrolysis • Wind-to-Hydrogen Systems • Hybrid Renewable Setups • Intermittency Challenges*
1200 - 1215	*Break*
1215 – 1300	***Hydrogen Production with CCUS (Blue Hydrogen)*** *Carbon Capture Technologies • Capture Rates and Efficiency • Storage and Utilization Pathways • CCUS Integration*
1300 – 1350	***Emerging Production Technologies*** *Methane Pyrolysis (Turquoise Hydrogen) • Biomass Gasification • Photoelectrochemical Water Splitting • Innovation Trends*
1350 – 1400	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1400	*Lunch & End of Day Two*

Day 3: ***Wednesday, 15th of July 2026***

0800 – 0900	***Hydrogen Storage Technologies*** *Compressed Gas Storage • Liquid Hydrogen Storage • Solid-State Storage (Metal Hydrides) • Underground Storage (Salt Caverns)*
0900 – 0930	***Hydrogen Transportation Methods*** *Pipelines (Repurposing Gas Networks) • Liquefied Hydrogen Shipping • Ammonia as a Hydrogen Carrier • Liquid Organic Hydrogen Carriers (LOHC)*
0930 – 0945	*Break*

0945 – 1100	***Infrastructure Development*** *Refueling Stations • Export Terminals • Integration with LNG Infrastructure • Logistics and Supply Chain Design*
1100 – 1200	***Safety & Risk Management*** *Hydrogen Leak Detection • Explosion Risks and Mitigation • Safety Standards and Best Practices • Emergency Response Planning*
1200 - 1215	*Break*
1215 – 1300	***Hydrogen Blending in Gas Networks*** *Blending Limits and Challenges • Impact on Pipelines and Equipment • Regulatory Considerations • Case Studies*
1300 – 1350	***Digitalization & Monitoring*** *IoT for Hydrogen Infrastructure • Real-Time Monitoring Systems • Predictive Maintenance • Digital Twins for Hydrogen Systems*
1350 – 1400	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1400	*Lunch & End of Day Three*

Day 4: ***Thursday, 16th of July 2026***

0800 – 0900	***Hydrogen in Power Generation*** *Hydrogen-Fired Turbines • Fuel Cells for Electricity • Grid Balancing and Storage • Backup Power Applications*
0900 – 0930	***Hydrogen in Transportation*** *Fuel Cell Vehicles (FCEVs) • Heavy-Duty Transport (Trucks, Buses) • Aviation and Maritime Applications • Infrastructure Requirements*
0930 – 0945	*Break*
0945 – 1100	***Hydrogen in Industry*** *Steel Production (DRI With Hydrogen) • Refining and Petrochemicals • Fertilizer Production (Ammonia) • Heat Applications*
1100 – 1200	***Hydrogen for Energy Storage*** *Power-to-Gas Systems • Seasonal Energy Storage • Integration with Renewables • Grid Stability Support*
1200 - 1215	*Break*
1215 – 1300	***Hydrogen Derivatives*** *Ammonia Production and Use • Methanol and Synthetic Fuels • Export Opportunities • Hydrogen Export Strategy*
1300 – 1350	***Carbon Reduction Impact*** *Emission Reduction Potential • Comparison with Electrification • Lifecycle Emissions Analysis • Role in Net Zero Pathways*
1350 – 1400	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1400	*Lunch & End of Day Four*

Day 5: ***Friday, 17th of July 2026***

0800 – 0900	***Hydrogen Economics & Investment*** *Project Financing Models • Cost Reduction Pathways • Government Incentives and Subsidies • Risk Analysis*

0900 – 0930	***Hydrogen Strategy*** *Aligning with Corporate Goals • Blue versus Green Hydrogen Positioning • Partnerships and Joint Ventures • Market Entry Strategies*
0930 – 0945	*Break*
0945 – 1100	***Project Development & Implementation*** *Feasibility Studies • Site Selection • Engineering and Design Considerations • Project Lifecycle Management*
1100 – 1200	***Hydrogen Policy & Global Markets*** *International Hydrogen Trade • Export Markets (Europe, Asia) • Certification and Standards • Geopolitical Considerations*
1200 – 1215	*Break*
1215 – 1230	***Innovation & Future Trends*** *Next-Gen Electrolysis Technologies • Hydrogen Hubs and Clusters • AI and Digital Optimization • Long-Term Outlook (2050 Scenarios)*
1230 – 1315	***Capstone Workshop & Action Planning*** *Develop Hydrogen Project • Identify Value Chain Opportunities • Evaluate Economic Feasibility • Present Implementation Roadmap*
1315 – 1330	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1330 – 1345	***POST-TEST***
1345 – 1400	*Presentation of Course Certificates*
1400	*Lunch & End of Course*

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-

Course Coordinator

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